

Purpose and Scope of the GCMRC's participation in the NGS Control Point Co-observation Project

The Grand Canyon Monitoring and Research Center (GCMRC) and cooperating agencies will be co-observing with the National Geodetic Survey (NGS) in densifying its High Accuracy Reference Network (HARN) control points in northern Arizona. A HARN control point is a centimeter level accuracy position on the Earth's surface. Due to difficulties in setting accurate control in areas of high vertical relief, there is currently a lack of accurate control points in Northern Arizona and the Grand canyon region. NGS has invited the GCMRC to co-observe during these sessions in the Grand Canyon – Colorado River area. GCMRC uses this control for spatially referencing and analyzing scientific data collected in the Colorado River Ecosystem.

GCMRC plans to co-observe 4 to 6 control points during the first session in January. These points, yet of undetermined locations, will be at places of easy access around the Grand Canyon and river corridor that will benefit the GCMRC science programs. NGS has the best facilities and expertise to resolve geodetic ambiguities that exist in setting control in areas with dramatic topographic relief such as the Grand Canyon. By having NGS perform the GPS reduction and adjustment, a substantial cost savings in office and field time can be realized.

Co-observation involves setting up GPS receivers on survey control points for specified periods of time. Upon completion, the data will be submitted to NGS for processing into their HARN control network. NGS will select 3 days per session to collect the GPS data. Each session will require daily 5 ½ hour observation times for 3 consecutive days at different times. The NGS procedures, protocols, and GPS receiver specifications are designed to achieve optimum results and must be carefully adhered to. The GCMRC survey department will offer detailed training to any cooperating agency willing to participate in the establishment of additional control points. There will be additional opportunity to established control points during the continued Nevada and Utah NGS operations in the coming months. The GCMRC survey department will coordinate co-observation sessions within the Grand Canyon area with NGS and cooperating agencies to prevent redundancy and ensure optimum distribution of control points.

Benefits to GCMRC and cooperating agencies are as follows:

- We may select the locations of the points to best suit our mapping and research needs.
- The NGS processing and adjustment is extremely accurate and robust.
- Set new points as well as improve the accuracy of our existing control network.
- Control point coordinates will be published to NGS standards.
- Coordinate additional GPS observations with cooperating agencies resulting in mutual benefits.
- Opportunity to complete a portion of some previously planned long-term GPS control survey operations with NGS assistance.
- NGS can assist GCMRC in the improvement and resolution of some inconsistencies in the regions ellipsoid height and Geoid model.

Please contact Mark Gonzales (fmgonz@flagmail.wr.usgs.gov) or Steve Lamphear (slamphea@flagmail.wr.usgs.gov) of the GCMRC survey department at 520-556-7459 if you are interested in co-observation or more information.